

ROHIT SINGLA

AREAS OF EXPERTISE

Medical imaging & analysis / artificial intelligence / computer-assisted surgery / augmented reality / ultrasound physics / chronic kidney disease / kidney transplantation

EDUCATION

MD/PhD (Biomedical Eng.) **University of British Columbia** **2018 - Present**
Dissertation: Multiparametric Ultrasound Imaging for Kidney Disease
Supervisors: Prof. Robert Rohling & Dr. Christopher Ngan

MASc (Biomedical Eng.) **University of British Columbia** **2015 - 2017**
Dissertation: Intra-operative Ultrasound-based Augmented Reality for Laparoscopic Surgical Guidance
Supervisor: Prof. Robert Rohling

BASc (Computer Eng.) **University of British Columbia** **2010 - 2015**
Concentration: Software Engineering. *CGPA:* 4.0

CERTIFICATES AND CERTIFICATIONS

Basic Certificate in Quality and Safety, Institute for Healthcare Improvement **2021**
Designing and Implementing AI Solutions for Health Care, Harvard Medical School **2021**
Basic Life Support Provider (Health Care Provider), Heart and Stroke Foundation **2018 - Present**

RECENT HONOURS AND AWARDS

<i>Travel Grant Award</i>	UBC SBME	\$1,500	2021
<i>Allied Health Kidney Doctoral Fellowship</i>	The Kidney Foundation of Canada	\$25,000	2021 - 2023
<i>Outstanding Reviewer - (top 1%)</i>	MICCAI Conference	---	2021
<i>Presidential Student Mentor Grant</i>	American Soc. of Transplant Surgeons	\$5000	2021
<i>Dr. J. Paul Whelan Urology Award</i>	Island Health Urology Dept.	\$1000	2021
<i>Student Leadership Award</i>	UBC Medical Alumni Assoc.	\$500	2020
<i>Vanier Scholarship - 1st nationally</i>	NSERC	\$150,000	2020 - 2023
<i>Four Year Fellowship</i>	UBC	\$72,800	2020 - 2024
<i>BC MEDTECH Graduate Award</i>	School of Biomedical Eng.	\$1450	2019
<i>Excellent Reviewer - (top 5%)</i>	ML4H at NeurIPS	---	2019
<i>Graduate Support Initiative</i>	School of Biomedical Eng.	\$4000	2019
<i>Graduate Award</i>	UBC Faculty of Medicine	\$7800	2019
<i>Clinician Investigator Scholarship</i>	UBC Faculty of Medicine	\$26,000	2019
<i>2nd Best Poster</i>	Western Section of AUA	\$500	2018
<i>Best Paper</i>	11th AE-CAI Workshop	\$250	2017
<i>Best Paper</i>	11th Urology Research Day	\$250	2017
<i>Graduate Student Initiative Award</i>	UBC	\$500	2017
<i>Rising Star Award</i>	UBC Faculty of Applied Science	---	2017
<i>Faces of Today Recipient</i>	UBC Student Leadership Conf.	---	2017
<i>Travel Grant</i>	UBC Engineers in Scrubs	\$1000	2016
<i>First Place</i>	Rick Hansen Access Innov. Challenge	---	2016
<i>Finalist, BME Excellence Award</i>	Medical Device Development Centre	---	2015
<i>Engineers in Scrubs Fellowship</i>	UBC	\$18,000	2015 - 2016

PUBLICATIONS AND PRESENTATIONS

Peer-Reviewed Journal Publications

1. Dawidek M, **Singla R**, Spooner L, Ho L, Nguan C. Clinical validation of an audio-based uroflowmetry app in adult males. *Canadian Urological Association Journal*. March 2022.
2. Burden E, Khehra K, **Singla R**, Spooner L, Cho A, Nguan C. PatientLink: A Patient Centered Status Dashboard for the Peri-operative Process. *British Medical Journal Innovations*. Sept 2021.
3. Fan K, Hu R, and **Singla R**. Introductory Machine Learning for Medical Students: A Pilot. *Medical Education – Really Good Stuff*. November 2020.
4. **Singla R**, Burlinson C, Honigmann S, Abolmaesumi P, Chau A, Rohling R. Interdisciplinary Development and Evaluation of a Novel Needle Guide For Ultrasound-Guided Lumbar Epidural Placement. *BMJ Innovations*. October 2020.
5. Hu R, **Singla R**, Deeba F, Rohling R. Acoustic Shadow Detection: Study and Statistics of B-Mode and Radiofrequency Data. *Ultrasound in Medicine and Biology*. 2019 Aug 1;45(8):2248-57.
6. Harriman DI, **Singla R**, Nguan C. The Resident Report Card: A Tool for Operative Feedback and Evaluation of Technical Skills. *The Journal of Surgical Research*. 2019 Jul 1;239:261-8.
7. Edgcumbe P, **Singla R**, Pratt P, Schneider C, Nguan C, Rohling R. Follow the light: projector-based augmented reality intracorporeal system for laparoscopic surgery. *Journal of Medical Imaging*. 2018 Feb;5(2):021216.
8. **Singla R**, Edgcumbe P, Pratt P, Nguan C, Rohling R. Intra-operative ultrasound-based augmented reality guidance for laparoscopic surgery. *Healthcare technology letters*. 2017 Nov 16;4(5):204-9.

Peer-Reviewed Conference Publications with Oral Presentations

1. Hu R, **Singla R**, Yan R, Mayer C, Rohling R. Acoustic Placenta Segmentation with a Convolutional Neural Network Weighted by Acoustic Shadow Detection. In *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS) 2019 Jul 23* (pp.6718-6723). IEEE. Berlin, Germany.
2. Honigmann S*, Zhu YC, **Singla R**, Abolmaesumi P, Chau A, Rohling R. EpiGuide 2D: visibility assessment of a novel multi-channel out-of-plane needle guide for 2D point of care ultrasound. In *SPIE Medical Imaging 2019: Image-guided Procedures, Robotic Interventions and Modelling 2019 Mar 8* (Vol. 10951, p. 109510K.) International Society for Optics and Photonics. San Diego, USA.
3. **Singla R**, Edgcumbe P, Pratt P, Nguan C, Rohling R. Intra-operative ultrasound-based augmented reality guidance for laparoscopic surgery. *12th Annual Augmented Environments for Computer-Assisted Interventions (AE-CAI)*. 2017 Sep. Quebec City, Canada.
4. Edgcumbe P, **Singla R**†, Pratt P, Schneider C, Nguan C, Rohling R. Augmented reality imaging for robot-assisted partial nephrectomy surgery. In *International Conference on Medical Imaging and Virtual Reality*. 2016 Aug 24. (pp.139-150). Bern, Switzerland.

Peer-Reviewed Conference Publications with Poster Presentations

*S. Honigmann received a best paper award in the area of surgical robotics and related topics

† Indicates joint first authorship

1. Hu Z, Hu R[‡], Yan R, Mayer C, Rohling R, **Singla R**. Automatic Placenta Abnormality Detection using Convolutional Neural Networks on Ultrasound Texture. In *Perinatal, Preterm and Paediatric Image Analysis (PIPP)*. 2021.
2. Ringstrom C*, **Singla R**,* Hu Z, Hu R, Lessoway V, Reid J, Nguan C, Rohling R. A Convolutional Neural Network is Comparable to Novices in Measuring Kidney Dimensions in Ultrasound. In *SPIE Medical Imaging: Computer-Aided Diagnosis*. 2022.

Conference Abstracts with Oral Presentations

1. Teng M, **Singla R**, Yau O, Lamoureux D, Gupta A, Hamm C, Hu Z, Hu R, Aissiou A, Eaton S, Hu S, Kelly D, MacMillan K, Malik S, Mazzoli V, Teng Y, Laricheva M, Jarus T, Field T. Healthcare Students' Perspectives on Artificial Intelligence: a Canadian National Survey. *Centre for Health Education Scholarship (CHES) Celebration of Scholarship*. 2021. Vancouver, Canada.
2. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. Addressing Perioperative Stress and Anxiety of Patient Supporters Through a Novel, Online Communications Platform: PatientLink. *Building the Future: Faculty of Medicine Research Trainee Day and Lecture Series*. 2020. Vancouver, Canada.[§]
3. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. PatientLink: A Novel Application to Address Stress and Anxiety in Patient Supporters During Surgical Operations. *Northwest Urological Society's 66th Annual Conference*. 2020. Vancouver, Canada.
4. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient Reported Outcomes from Renal Transplant Recipients: Initial Results from A Single Centre Study. *Northwest Urological Society's 66th Annual Conference*. 2020. Vancouver, Canada.
5. **Singla R**, Lundeen C, Forbes C, Hogarth D, Nguan C. Fluoroscopic targeting of renal calculi during extracorporeal shockwave lithotripsy using a machine learning algorithm. *American Urological Association*. 2019. Chicago, USA.
6. Dawidek M, **Singla R**, Cho A, Ho L, Nguan C. Pilot: Clinical Comparison of An Audio-based Uroflowmetry App Against Conventional Uroflowmetry in Adults. *UBC Urology 13th Annual Lorne D. Sullivan Research Day*. 2019. Vancouver, Canada.
7. **Singla R**, Lundeen C, Forbes C, Hogarth D, Nguan C. Update on renal calculus targeting using machine learning for extracorporeal shockwave lithotripsy. *UBC Urology 13th Annual Lorne D. Sullivan Research Day* 2019. Vancouver, Canada.
8. **Singla R**, Forbes C, Lundeen C, Nguan C. Automatic renal calculi localization in fluoroscopy for extracorporeal shockwave lithotripsy. *UBC Urology 12th Annual Lorne D. Sullivan Research Day*. 2018. Vancouver, Canada.
9. **Singla R**, Rohling R, Nguan C. HoloSurgeon: towards an augmented reality enhanced surgical warm-up method. *UBC Urology 12th Annual Lorne D. Sullivan Research Day*. 2018. Vancouver, Canada.
10. Schneider C, **Singla R**, Hetherington J, Forbes C, Tang S, Lan J, Rohling R, Nguan C. Quantitative measurement of Tacrolimus-induced tremor in renal transplant recipients: a prospective feasibility study. *UBC Urology 12th Annual Lorne D. Sullivan Research Day*. 2018. Vancouver, Canada.
11. Burlinson C, **Singla R**, Honigmann S, Abolmaesumi P, Rohling R, Chau A. Single-operator, real-time ultrasound-guided neuraxial anaesthesia using a novel needle guide and 2D ultrasound. *European Society of Regional Anaesthesia and Pain Therapy*. 2018. Dublin, Ireland.

[‡] Indicates joint first authorship

[§] L. Burden received the "Best Presentation" award as an outstanding work amongst all trainees.

12. **Singla R**, Edgcombe P, Pratt P, Nguan C, Rohling R. Intuitive Intraoperative Ultrasound-based Augmented Reality for Robot-Assisted Laparoscopic Surgery. *UBC Urology 11th Annual Lorne D. Sullivan Research Day*. 2017. Vancouver, Canada.

Conference Abstracts with Poster Presentations

3. **Singla R**, Ringstrom C, Lessoway V, Reid J, Nguan C, Rohling R. Towards Label Efficient Multi-class Kidney Ultrasound Segmentation. *Image Guided Therapeutics and Diagnostics Symposium*. 2021.
4. Ringstrom C, **Singla R**, Lessoway V, Reid J, Nguan C, Rohling R. Automatic Measurement of Kidney Length in Ultrasound using a Convolutional Neural Network. *Image Guided Therapeutics and Diagnostics Symposium*. 2021.
5. R Hu, Z Hu, Yan R, Mayer C, Rohling R, **Singla R**. Automated Placental Disease Prediction in Ultrasound with Neural Networks. *Image Guided Therapeutics and Diagnostics Symposium*. 2021.
6. Breakey S, Kulanthaivelu R, Kalantri A, Xu K, **Singla R**, Nguan C, Riazzy M, Harris A. Shear wave elastography as a prognostic tool in patients undergoing kidney biopsies. *RSNA*. 2021.
7. Hu Z**, Hu R, **Singla R**, Yan R, Rohling R, Mayer C. Automated AI-based risk stratification of placental disease from ultrasound imaging with a convolutional neural network system. *UBC Radiology Research Day*. 2021. Virtual.
8. **Singla R**, McBurney K, Gil-Mohapel J. Near Peer Anatomy Tutoring in Medical Education: A Pilot Study. *Canadian Conference on Medical Education*. 2021. Virtual.
9. Burden L, **Singla R**, Farrell L. Parental Leave Policies in Canadian Undergraduate Medical Education: A Policy Review. *Canadian Conference on Medical Education*. 2021. Virtual.
10. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. PatientLink: a novel application to address stress and anxiety in patient supporters during surgical operation. Canadian Urological Association Conference. 2020. Victoria, Canada.
11. Davey C, Lyman K, **Singla R**, Harriman D, Nguan C. "Baseline Measurements of Physical Function and Frailty in Pre-Transplantation End Stage Renal Disease Patient". Canadian Urological Association Conference. 2020. Victoria, Canada.
12. Dawidek M, **Singla R**, Spooner L, Nguan C. Clinical Validation of an Audio-based Uroflowmetry App in Adult Males. Canadian Urological Association Conference. 2020. Victoria, B.C.
13. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient reported outcomes from renal transplant recipients: initial results from a single centre study. Canadian Urological Association Conference. 2020. Victoria, B.C.
14. Burden L, Spooner L, **Singla R**, Khehra K, Cho A, Nguan C. PatientLink: A Novel Application to Address Stress and Anxiety in Patient Supporters During Surgical Operations. *Quality Forum 2020: Shaping Success Together*. 2020. Vancouver, Canada.
15. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient Reported Outcomes from Renal Transplant Recipients: Initial Results from A Single Centre Study. *Quality Forum 2020: Shaping Success Together*. 2020. Vancouver, Canada.
16. Philips D, Gill D, **Singla R**, Spooner L, Tang S, Nguan C. A Novel Device to Monitor Gross Hematuria After Urologic Surgery. *Quality Forum 2020: Shaping Success Together*. 2020. Vancouver, Canada.
17. Khehra K, Stewart C, Cho A, **Singla R**, Nguan C. Patient Reported Outcomes in Renal Transplant Recipients and Donors Over One Year: A Single Institution Experience. *Western Section of American Urological Association*. 2019. Monterey, USA.

** Z. Hu received the Canada Diagnostic Centre's Best Poster Award as an outstanding work among medical trainees.

18. Schneider C, **Singla R**, Forbes C, Hetherington J, Cho A, Tang S, Rastin T, Hoyda T, Lan J, Nguan C. Quantitative Measurement of Tacrolimus-induced Tremor in Renal Transplant Recipients: A Prospective Feasibility Study. *Western Section of American Urological Association*. 2019. Monterey, USA.
19. Voznyuk S, Mehdi H, **Singla R**, Rohling R, Gill M, Nguan C. An Interdisciplinary Approach to Preventing Retained Surgical Items with the Use of Augmented Reality. *Collaborating Across Borders VII Conference: Crossroads of Collaboration*. 2019. Indianapolis, USA.
20. Burden L, Khehra K, **Singla R**, Cho A, Nguan C. Surveying Sources of Anxiety in Family and Friends of Patients Undergoing Surgical Operations. *UBC Urology 13th Annual Lorne D. Sullivan Research Day*. 2019. Vancouver, Canada.
21. **Singla R**, Forbes C, Lundeen C, Nguan C. Renal calculus targeting using machine learning for extracorporeal shockwave lithotripsy (ESWL). *Western Section of American Urology Association*. 2018. Monterey, USA.
22. Burlinson C, **Singla R**, Honigmann S, Hetherington J, Abolmaesumi P, Rohling R, Chau A. Feasibility of 2D ultrasound guided, real-time, single operator, midline lumbar epidural placement using a novel needle guide. *Society of Obstetric Anesthesiology and Perinatology*. 2018. Miami, USA.
23. Collins J, Gunka V, Taylor J, **Singla R**, Rohling R, Massey S. Assessment of shivering with a smartphone application in parturients undergoing cesarean delivery under epidural anesthesia. *Society of Obstetric Anesthesiology and Perinatology*. 2018. Miami, USA.

Policy Papers

1. *Policy 044 – Pregnancy and New Parenthood during Medical School*. UBC Medical Doctorate Undergraduate Program. 2020. Vancouver, Canada.
2. *Preparing Medical Students for the Impact of Artificial Intelligence on Healthcare*. Canadian Federation of Medical Students. 2020. Toronto, Canada.

Invited Presentations

1. BC Renal Grand Rounds, Vancouver, BC. 2021
2. Solid Organ Transplant Grand Rounds at BC Children’s Hospital, Vancouver, BC. 2020
3. UBC Medical Undergraduate Program Seminar, Vancouver, BC. 2020
4. MD/PhD Open House, Vancouver, BC. 2020
5. UBC Island Medical Undergraduate Program Seminar, Victoria, BC. 2019
6. Anesthesiology Resident Rounds, Vancouver, BC. 2017
7. Institute for Healthcare Improvement - Health Innovation for All, Vancouver, BC. 2017

Interviews and Media Relations

1. *Aspire*. UBC Faculty of Medicine (video interview). 2021
2. *Interfaces Podcast*. UBC School of Biomedical Engineering (audio interview). 2021
3. *Interview with an MD/PhD Candidate*. UBC Medical Journal (text interview). 2021
4. *Mental Health Talk*. UBC Faculty of Medicine (video interview). 2020
5. *Day in the Life*. UBC Faculty of Medicine (video profile). 2020
6. *How it’s Med Podcast*. How it’s Med (audio interview). 2020
7. *Humans of CITAC*. Clinician-Investigator Trainee Association of Canada (text interview). 2020
8. *Meet our Students*. UBC Faculty of Graduate and Postdoctoral Studies (text interview). 2020
9. *SBME Students Rohit Singla and Prashant Pandey Receive 2020 Vanier Canada Graduate Scholarships*. School of Biomedical Engineering (text interview). 2020
10. *Rohit Singla Named 2020 Vanier Scholar*. Island Medical Program (text interview). 2020

11. *Rising Star*. UBC Faculty of Applied Science (text interview). 2017

12. *Finding new ways to visualize the body: 3D surgical markings*. UBC Elec. & Comp. Eng. (text interview). 2015

Patents

1. Rohling R, **Singla R**, Honigmann S, Burlinson C, Hetherington J, Abolmaesumi P. *Apparatus, System, and Methods for Imaging a Medical Device in the Body*. US Provisional Patent No.: 62/666,260. Percentage: 15%.

RESEARCH EXPERIENCE

- | | | |
|--|---------------------------------------|--------------------|
| Research Engineer | University of British Columbia | 2018 |
| <i>Supervisors:</i> Rob Rohling, Christopher Ngan, Anton Chau, Purang Abolmaesumi, Chantal Mayer | | |
| <ul style="list-style-type: none"> • Coordinated 12 research projects with 3 different hospital departments (Urology, Anesthesia, and Maternal/Fetal Medicine). • Led the writing of 5 grants, receiving \$135,000 over two years. • Developed an iOS app to record and quantify laboring women's shivering. Released on the app store. • Used neural networks to detect kidney stones in fluoroscopy, achieving a mean precision of 0.70 ± 0.10. • Developed two prototype HoloLens apps (3D spine modelling and a simulated operating room) in Unity | | |
| Graduate Research Assistant | University of British Columbia | 2015 - 2017 |
| <i>Supervisor:</i> Rob Rohling | | |
| <ul style="list-style-type: none"> • Led development on 3 ultrasound-based augmented reality systems for kidney cancer surgery, using C++, OpenCV and OpenGL, achieving a 50% improvement in healthy tissue removed in mock surgeries. • Collaborated with Northern Digital Inc. and Imperial College London | | |
| Undergrad. Research Assistant | University of British Columbia | 2014 - 2015 |
| <i>Supervisors:</i> Rob Rohling and Purang Abolmaesumi | | |
| <ul style="list-style-type: none"> • Developed software for using a mini-projector and ultrasound with a surgical robot to enhance the surgical view during kidney cancer surgeries. In collaboration with Imperial College London. • Developed software to perform computer visions tasks including stereo correspondence, noise filtering, feature detection, tracking and camera calibration. | | |

TEACHING EXPERIENCE

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|--|--|--------------------|
| Near Peer Tutors Coordinator | UBC Undergraduate Medicine | 2019 - 2020 |
| <ul style="list-style-type: none"> • MEDD 422 Transition into Clinical Education | | |
| Session Facilitator | UBC Undergraduate Medicine | 2019 |
| <ul style="list-style-type: none"> • MEDD 421 Foundations of Medical Practice III | | |
| Graduate Teaching Assistant | UBC Electrical & Computer Eng | 2016 |
| <ul style="list-style-type: none"> • EECE 542 Computer-integrated Surgery • ELEC 442 Introduction to Robotics | | |
| Guest Lecturer | UBC Electrical & Computer Eng | 2016 |
| <ul style="list-style-type: none"> • EECE 544 Medical Imaging • BMEG 500 Orientation to the Clinical Environment | | |

17. *Reviewer*. Information Processing for Computer-Assisted Interventions Conf. (IPCAI) **2018**

MENTORING EXPERIENCE

1. Cailin Ringstrom, Undergraduate Student (UBC), Co-op work term **2021**
2. Zoe Hu, Medical Student (Queen's University), volunteer research project **2020 - 2021**
3. Liz Burden, Medical Student (UBC), Flexible Enhanced Learning (FLEX) project **2019 - 2020**
4. Alex Waslen, Undergraduate Student (UBC), Co-op work term **2020**
5. Colin Davey, Medical Student (UBC), Flexible Enhanced Learning (FLEX) project **2019**
6. Caelie Stewart, Medical Student (UBC), Flexible Enhanced Learning (FLEX) project **2019**
7. Keesha Khehra, Medical Student (UBC), Flexible Enhanced Learning (FLEX) project **2018**
8. Ricky Hu, Graduate Student (UBC), Master's thesis **2018**
9. Simon Honigmann, Undergraduate Student (UBC), Co-op work term **2017 - 2018**

SELECTED VOLUNTEER SERVICE

Founder **UBC AI in Medicine** **2019 - Present**

- Created a nationally run series of hands-on educational workshops for non-technical medical students to learn and understand AI as applied to medicine. 200 students from 9 medical schools.
- Created a club focused on improving awareness of and exposure to AI technology within healthcare for medical trainees given the increasing prevalence of AI.

Student Affairs Rep **University of British Columbia** **2018 - Present**

- Student advocate for medical student well-being and support in conjunction with faculty and staff, acting as a point-of-contact for questions and concerns related to the MD program or otherwise.

Section Editor, Reviews **UBC Medical Journal** **2018 - Present**

- Responsible for facilitating the peer review process of student articles, eliciting faculty member reviews, and providing prompt and succinct revision requests to authors.

Vice President, Island Medical **University of British Columbia** **2018 - 2019**

- Elected class representative for a cohort of 32 medical students in the Island Medical Program.

Co-Director **Hatching Health** **2016 - 2017**

- Led a team of 6 in logistics and execution of a 135-person medical technology hackathon, while fundraising \$25,000 to run the 3-day event.

Founder and Mentor **Biomedical Eng. Connections** **2016 - 2017**

- Started a paired mentorship initiative to connect 27 undergraduate, new graduates and current graduate students together to promote a community of support.

Radio Host **Sharing Science Radio** **2015 - 2017**

- Organized a bi-weekly science-themed radio show with news and interviews intended for the layperson. Select topics include medical imaging, salmon, deep sea exploration, and science education.

Co-Founder and President **UBC Technology in Medicine** **2014 - 2015**

- Led the club in facilitating 3 hands-on laparoscopic surgery workshops and seminars to educate students. Topics included: surgical technology, medtech collaboration, and e-Health technologies.

